

FACT SHEET

This fact sheet is a companion document to the draft National Pollutant Discharge Elimination System (NPDES) Permit No. WA-002268-3. The Department of Ecology (Ecology) is proposing to issue this permit which will allow discharge of treated municipal wastewater to waters of the state of Washington.

This fact sheet explains the nature of the proposed discharge, Ecology's decisions on limiting the pollutants in the wastewater, and the regulatory and technical basis for those decisions.

Applicant: City of Castle Rock
P.O. Box 370
Castle Rock, WA 98611-0370

Facility Name and Address: Castle Rock Wastewater Treatment Plant
118 Cummings Street SW
Castle Rock, WA

Type of Treatment: Municipal Secondary -- Trickling Filter

Discharge Location: Cowlitz River, between river miles 16 and 17

Latitude: 46° 16' 02" N.
Longitude: 122° 54' 26" W.

Water Body ID Number: WA-26-1040

The Code of Federal Regulations, Title 40, Part 122, Section 21 (40 CFR 122.21) requires a permittee with a currently effective permit to submit a new application 180 days before the existing permit expires. The previous NPDES permit expired on October 23, 1985.

I. WASTEWATER TREATMENT PLANT AND DISCHARGE INFORMATION

Wastewater Treatment Plant Description

The original Castle Rock wastewater treatment plant (WWTP) was constructed in 1954 to, according to the report titled *City of Castle Rock, Wastewater Facilities Planning Study, Wastewater Treatment Plant Improvements, September 1975*, “eliminate the discharge of untreated wastewater into the Cowlitz River.”

This treatment plant was designed to achieve a “75% reduction of sewage strength and that design met with full approval of the state water pollution control authorities.”

The original WWTP consisted of a headworks, with Parshall flume and comminutor, an Imhoff tank, a trickling filter, a secondary clarifier, a chlorine contact tank, and an effluent pipe to the Cowlitz River that discharged “4 to 5 feet below normal river flow.” Sludge from the Imhoff tank received dewatering on uncovered drying beds and sludge from the secondary clarifier was routed to the headworks and treated again in the system. The influent manhole was constructed with a bypass to the Cowlitz River.

The available design criteria of that WWTP had an average flow of 0.275 million gallons per day (MGD), a peak flow of 0.825 MGD, and a 5-day biochemical oxygen demand (BOD₅) concentration of 200 milligrams per liter (mg/l).

In mid-1970 Castle Rock produced a facilities plan to upgrade the WWTP to produce an effluent that met the new secondary treatment standards. The facilities plan recommended construction of a new grit removal system, a new primary clarifier, a new trickling filter, a new secondary clarifier, and conversion of the existing secondary clarifier to a chlorine contact tank. Other work apparently included construction of a diffuser in the Cowlitz River and new sludge drying beds. The facilities plan was approved by the Environmental Protection Agency (EPA) and Ecology on April 20, 1976.

Ecology approved the plans and specifications for construction with the design criteria listed in Table 1.

Table 1. Castle Rock WWTP Design Criteria

Average Daily Dry Weather Flow	0.4 MGD
Average Wet Weather Flow	0.69 MGD
Peak Wet Weather Flow	1.2 MGD
BOD ₅ Influent Loading	800 lb/d
TSS Influent Loading	unavailable
Population	4000

TSS = total suspended solids

lb/d = pounds per day

During the summer of 1995, on behalf of Castle Rock, Jerome Morrisette & Associates submitted a report to construct a diffuser on the outfall. The report states that the WWTP outfall “was either buried in the mud and debris or carried away downstream” as a result of the eruption of Mt. St. Helens in 1980.

Partly because the Corps of Engineers has determined that the river bed has stabilized and because FEMA funding was available for a limited time, Castle Rock began to plan for construction of a diffuser. Ecology approved the engineering report for this work on July 28, 1995, and approved the plans and

specifications for construction on August 9, 1995. Diffuser construction in the river was completed during the summer of 1995. In June 1996, the contractor completed additional valving work at the WWTP to complete the project.

Previous Permit Limitations and Summary of Compliance With the Previous Permit

The previous permit for this treatment plant was issued on October 13, 1980. This permit had effluent limitations for BOD₅, TSS, pH, and fecal coliform bacteria. According to the Discharge Monitoring Reports (DMRs) for the past five years, Castle Rock has complied with the limitations in the 1980 permit except for: (1) 5 monthly average concentrations for BOD₅, (2) 4 monthly average percent removals for BOD₅, (3) 5 monthly average percent removals for TSS, (4) 2 monthly average values for fecal coliform bacteria, and (5) 1 pH excursion.

Ecology performed the latest Class I inspection on May 1, 1996.

Wastewater Characterization

Castle Rock submitted a complete application for permit renewal to Ecology on March 20, 1996. Ecology has characterized the average daily discharge, as described in the DMRs for the past two years, for the parameters listed in Table 2.

Table 2. Castle Rock WWTP Effluent Characterization
Average Daily Discharge

Effluent Flow	0.188 MGD
BOD ₅	17 mg/l
TSS	20 mg/l
Chlorine	1.0 mg/l

II. PROPOSED PERMIT LIMITATIONS AND CONDITIONS

Federal and state regulations require that effluent limitations in a NPDES permit must be either technology-, water quality-, or human health-based. Technology-based limitations are set by regulation (40 CFR 133, and Chapters 173-220 and 173-221 WAC). Water quality-based limitations for the protection of aquatic life and human health are based upon compliance with the Water Quality Standards (Chapter 173-201A) and the National Toxics Rule (Federal Register, V. 57, No. 246, Tuesday, December 22, 1992), respectively. The more stringent of these three criteria must be chosen for each of the parameters of concern.

Technology-based Effluent Limitations

Chapter 90.48 of the Revised Code of Washington (RCW 90.48) requires the use of all known, available and reasonable methods to prevent and control the pollution of the waters of the state of Washington. WAC 173-220 and WAC 173-221 implement RCW 90.48 by setting discharge standards which represent all known, available, and reasonable methods of prevention, control, and treatment for domestic wastewater facilities which discharge to waters of the state. In addition to the state code and regulations, the draft permit limits the discharge of pollutants in accordance with 40 CFR 133.102.

The federal and state technology-based limitations follow:

BOD₅. Both 40 CFR 133.102(a) and WAC 173-221-040(1) describe the minimum level effluent quality required for BOD₅. The WWTP effluent shall comply with the following BOD₅ limitations: The 30-day average shall not exceed 30 mg/l. The 7-day average shall not exceed 45 mg/l. The 30-day average percent removal shall not be less than 85 percent.

TSS. Both 40 CFR 133.102(b) and WAC 173-221-040(1) describe the minimum level effluent quality required for TSS. The WWTP effluent shall comply with the following TSS limitations: The 30-day average shall not exceed 30 mg/l. The 7-day average shall not exceed 45 mg/l. The 30-day average percent removal shall not be less than 85 percent.

However, 40 CFR 133.101(g) allows “facilities eligible for treatment equivalent to secondary treatment” to be eligible for consideration for effluent limitations described for treatment equivalent to secondary treatment in 40 CFR 133.105 if: (1) the BOD₅ and TSS effluent concentrations consistently achievable through proper operation and maintenance (40 CFR 101(f)) of the treatment plant exceed the minimum level of the effluent quality set forth in 40 CFR 102(a) and (b), (2) a trickling filter is used as the principal process, and (3) the treatment plant provides significant biological treatment of municipal wastewater.

Forty (40) CFR 133.105 describes the minimum level of effluent quality attainable by municipal wastewater treatment plants for treatment equivalent to secondary treatment for the parameters BOD₅, TSS, and pH. Forty (40) CFR 133.105(a) and (b) require achievement of the following for BOD₅ and TSS: (1) the 30-day average shall not exceed 45 mg/l, (2) the 7-day average shall not exceed 65 mg/l, and (3) the 30-day average percent removal shall not be less than 65 percent.

As stated in 40 CFR 133.105(d) the director of Ecology can, with EPA approval, adjust the minimum levels of effluent quality set forth in 133.105(a) and (b) to conform to the BOD₅ and TSS effluent concentrations achievable through proper operation and maintenance by the median (50th percentile) treatment plant in a representative sample of plants within a state or appropriate contiguous geographical area that meet the definition of facilities eligible for treatment equivalent to secondary treatment.

Finally, 40 CFR 133.105(f) requires more stringent limitations when adjusting permits if: (1) for existing treatment plants the permitting authority determines the 30-day average and 7-day average BOD₅ and TSS effluent concentrations achievable through proper operation and maintenance of the treatment works, based on an analysis of the past performance of the treatment plant, would enable the Permittee to achieve more stringent limitations. Forty (40) CFR 133.101(f) defines effluent concentrations consistently achievable through proper operation and maintenance as (1) for a given pollutant parameter, the 95th percentile value for the 30-day average effluent quality achieved by a treatment works in a period of at least two years, excluding values attributable to upsets, bypasses, operational errors, or other unusual conditions, and (2) a 7-day average value equal to 1.5 times the value derived for the 30-day average.

The state regulation for alternative discharge standards and effluent limitations for trickling filters, WAC 173-221-050(1), is similar to the federal regulation except the state regulation does not include 40 CFR 133.105(d). This federal regulation requires determining, comparing and using, if these are the most stringent limitations, the 50th percentile values for BOD₅ and TSS effluent concentrations of trickling filters within the state or contiguous geographical area. The state regulation does not include the federal requirement to determine the 50th percentile values.

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The state regulation in WAC 173-221-050(5) requires that alternative effluent limitations must meet all of the following conditions: (1) the effluent shall not cause water quality violations, (2) the Permittee shall identify effluent concentrations consistently achievable through proper operation and maintenance, (3) the Permittee shall demonstrate that industrial wastewater does not interfere with the domestic wastewater treatment plant, (4) the wastewater treatment plant must treat flow and loadings within the Ecology approved design criteria, (5) the Permittee must complete an analysis of whether seasonal alternative effluent limits are more appropriate than year-round, and (6) the wastewater treatment plant must meet all other permit requirements and conditions.

Using the past five years of DMR data the permit writer calculated the following values:

Table 3. 95th Percentile Values for BOD₅ and TSS Effluent Concentrations

Parameter	95th Percentile Value
BOD ₅	25 mg/l
TSS	26 mg/l

The 30-day average and 7-day average BOD₅ and TSS effluent concentrations achievable through proper operation and maintenance of the treatment works, based on an analysis of the past performance of the treatment plant, enable Castle Rock to achieve more stringent limitations than the limitation in 40 CFR 133.105(a) and (b). However, the BOD₅ and TSS effluent concentrations achievable through proper operation and maintenance of the treatment works are stricter than the secondary effluent limitations in 40 CFR 133.102(a) and (b). The permit writer is using best professional judgment to use the BOD₅ and TSS effluent concentrations contained in 40 CFR 133.102(a) and (b).

Table 4. 95th Percentile Values for BOD₅ and TSS Percent Removal

Parameter	95th Percentile Value
BOD ₅	84 percent
TSS	81 percent

The analyses show that 85 percent removal of BOD₅ and TSS cannot be consistently achieved by Castle Rock through proper operation and maintenance. Because the regulations describe effluent concentrations consistently achievable through proper operation and maintenance the permit writer is using best professional judgment to specify the alternative percent removal requirements in 40 CFR

133.105(a) and (b). The percent removal requirements in the draft permit for BOD₅ and TSS are 65 percent.

The draft permit's effluent mass limitation for BOD₅ is determined by evaluating two different conditions. In the first condition the permit writer calculates the effluent mass limitation using the wet weather design flow and the effluent concentration limitation in the following mathematical expression:

$$\text{Wet weather design flow (0.69 MGD)} \times \text{Concentration limit (30 mg/L)} \times 8.34 \text{ (lb/d/mg/l/MGD)} = \text{mass limit (173 lb/d)}$$

$$\text{Weekly average effluent mass limitation} = 1.5 \times \text{monthly loading (173 lb/d)} = 260 \text{ lb/d}$$

The second evaluation for the BOD₅ mass limitation requires multiplying the percentage removal requirement by the influent design loading. The calculations follow:

$$\text{Influent design loading (800 lb/d)} \times \text{Percent removal requirement (1-0.65)} = 280 \text{ lb/d}$$

$$\text{Weekly average effluent mass limitation} = 1.5 \times \text{monthly loading (280 lb/d)} = 420 \text{ lb/d}$$

The first evaluation yields the more restrictive mass limitation for BOD₅ so the draft permit specifies that limitation.

When the WWTP was designed in mid-1970 the engineering firm did not include design criteria for TSS. The permit writer is using best professional judgment to assume that the influent concentration of TSS is similar to the influent design concentration of BOD₅. Therefore, the effluent mass limitations for TSS are the same.

pH. 40 CFR 133.103(c) and WAC 173-221-040(3) describe the minimum level of effluent quality required for pH. The effluent pH value shall be maintained within the limits of 6.0 to 9.0 unless the WWTP demonstrates that: Inorganic chemicals are not added to the waste stream as part of the treatment process; contributions from industrial sources do not cause the pH of the effluent to be less than 6.0 or greater than 9.0; and the discharge does not cause water quality violations outside of an approved dilution zone.

Fecal coliform bacteria. WAC 173-221-040(2) contains the minimum level of effluent quality required for fecal coliform bacteria. The fecal coliform bacteria limits shall not exceed a monthly geometric mean of 200 organisms per 100 ml, and a weekly geometric mean of 400 organisms per 100 ml.

Water Quality-based Effluent Limitations

WAC 173-201A, Water Quality Standards for Surface Waters of the State of Washington, establishes water quality standards for the state's surface waters consistent with the public's health and enjoyment, and the propagation and protection of fish and wildlife that use the waters. The water use and quality criteria, Sections -030 through -140, were established in conformance with present and potential water uses and considered the natural water quality potential and limitations of the waters. In addition the Environmental Protection Agency issued 91 numeric water quality criteria for the protection of human health. These regulations require that waste discharge permits, including NPDES permits, are conditioned so the authorized discharge will not cause a violation of the water quality standards.

General Water Use and Criteria Classes

Section -030 lists the general water use and criteria classes for waters of the state. The Cowlitz River, in the vicinity of the outfall, is identified in Section -130 as a Class A water. Class A water shall meet or exceed the requirements for all or substantially all of the following characteristic uses:

water supply (domestic, industrial, and agricultural); stock watering; fish migration, rearing, spawning and harvesting; wildlife habitat; recreation; sport fishing; commerce and navigation.

In addition to the general characteristics and characteristic use requirements, Section -030 lists numeric water quality criteria for fecal coliform bacteria, dissolved oxygen, total dissolved gas, temperature, pH, and turbidity. This section also limits acute and chronic toxicity, radioactivity, and other deleterious materials, and prohibits the impairment of the water's aesthetic value.

Toxic Substances

Chapter 173-201A-040 WAC states that toxic substances shall not be introduced above natural background levels in waters which have the potential, either singularly or cumulatively, to adversely affect characteristic water uses, cause acute or chronic toxicity to the most sensitive biota dependent upon the waters, or adversely affect public health, as determined by Ecology. This section requires chemical testing, acute and chronic toxicity testing, and biological assessments, as appropriate, to evaluate if the characteristic uses are being affected. Subsection (3) of Section -040 lists acute and chronic numerical criteria for several chemical elements and chemical compounds for the protection of aquatic life.

The National Toxics Rule specifies the numeric criteria for human health protection. Numeric criteria in the National Toxics Rule and the Water Quality Standards are used to calculate permit limitations.

Antidegradation

The antidegradation policy, WAC 173-201A-070, states discharges shall not degrade the existing quality of the receiving water. When the natural conditions of a receiving water are of lower quality than the criteria assigned, the natural conditions shall constitute the water quality criteria. Similarly, when the natural conditions of a receiving water are of higher quality than the criteria assigned, the natural conditions shall constitute the water quality criteria.

Mixing Zones

Discharges of wastewater treated to AKART standards may not comply with the water quality criteria at the point of discharge. WAC 173-201A allows the discharge permit to locate and size a mixing zone if: (1) AKART is fully applied to the discharge prior to being authorized a mixing zone, (2) the mixing zone determination considers the critical discharge conditions, (3) mixing zones will not be allotted unless supporting information indicates the zones would not have a reasonable potential to cause a loss of sensitive or important habitat, substantially interfere with the existing or characteristic uses of the water body, result in damage to the ecosystem, or adversely affect public health as determined by Ecology, (4) the discharge will not cause a violation of water quality criteria beyond the boundary of the mixing zones, (5) and the size of a mixing zone and the concentrations of pollutants present shall be minimized.

For example, the maximum size for a mixing zone in a river shall comply with the following: (1) the zone shall not extend downstream for a distance from the outfall of greater than 300 feet plus the depth of

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the water over the discharge, or extend upstream for a distance of over 100 feet; (2) not utilize over 25 percent of the flow; or (3) shall not occupy greater than 25 percent of the cross sectional width of the water body. Chronic water quality standards must be met at the boundaries of the dilution zone described.

In addition, the regulation requires the Permittee to demonstrate, to Ecology's satisfaction, that the concentration, duration, and frequency of exposure to the discharge will not create a barrier to the migration or translocation of indigenous organisms to a degree that has the potential to cause damage to the ecosystem. The regulation contains acute criteria for toxic materials which, if complied with, demonstrate a migration barrier or translocation should not occur for most species.

The regulation describes a zone where acute criteria may be exceeded. Again, using the river mixing zone example, the zone where acute criteria may be exceeded shall comply with the most restrictive combination of the following: (1) not extend beyond 10 percent of the distance to the upstream and downstream boundaries of an authorized mixing zone; (2) not utilize greater than 2.5 percent of the flow; and (3) not occupy greater than 25 percent of the cross-sectional width of the river.

Exceedences of the size criteria may be considered under the specific conditions listed in Subsection (12) and (13).

Because of the reasonable potential for pollutants in the discharge to exceed water quality criteria, Ecology will authorize mixing zones. These zones comply with WAC 173-201A-100. During the low flow river conditions the diffuser ports are approximately 7 feet below the river's surface. The dimensions of the authorized mixing zones follow:

- Chronic -- not extend in a downstream direction for a distance from the discharge ports greater than 307 feet, or not extend upstream for a distance over 100 feet.
- Acute -- not extend beyond a distance of 31 feet in the downstream direction or beyond a distance of 10 feet in the upstream direction.

Ecology's *Permit Writer's Manual* requires the permit writer to use center-line dilution factors for unidirectional flow in the receiving water. For the acute evaluation the manual requires using the highest daily maximum plant effluent flow for the past three years when the critical condition is likely to occur. From the DMRs and for the months of August, September, and October, this flow value is 0.422 MGD. For the chronic evaluation the manual requires use of the highest monthly average plant effluent flow for the past three years when the critical condition is likely to occur. This flow value is 0.236 MGD.

The permit writer used the computer modeling program PLUMES to calculate the dilution factors during the critical condition. Most of the input data was provided by Morrisette and Associates, Inc., except for the WWTP flow and the receiving water temperature and pH. The permit writer used the 90th percentile temperature and pH from a Cowlitz River monitoring station.

Appendix B contains the modeling program output. Table 4 presents the calculated dilution factors for the critical condition.

Table 5. Acute and Chronic Dilution Factors

Acute Dilution Factor	6
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Chronic Dilution Factor	145
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Evaluation for Compliance With the Water Quality Standards

Pollutants in an effluent may affect the aquatic environment near the point of discharge (near field) or at a considerable distance from the point of discharge (far field). Toxic pollutants, for example, can have an adverse affect near the point of discharge where the concentration is greatest, while a pollutant such as BOD₅ can have the most adverse affect some distance away from the discharge. The method of calculating water quality-based effluent limitations varies with the point at which the pollutant has its maximum effect.

Water quality-based limitations are calculated for the waterbody's critical condition and considers the variability of the pollutant concentrations in both the effluent and the receiving water. The critical condition represents the receiving water and waste discharge condition with the highest potential for adverse impact on the aquatic biota and existing or characteristic water body uses.

BOD₅. The impact of BOD₅ on the receiving water was modeled using the Streeter-Phelps Model, at critical receiving water conditions and with the technology-based effluent limitation for BOD₅ of 30 mg/l. Under critical conditions the calculations indicate no violation of the water quality standards for dissolved oxygen. Since the technology-based limitation is protective of the dissolved oxygen criteria the permit specifies the technology-based effluent limitation for BOD₅. Appendix B has the spreadsheet output.

Temperature and pH. The impact of the effluent's pH and temperature on the receiving water were modeled using the following data: dilution factor of 145, upstream temperature 13.9°C, upstream pH 7.7, upstream alkalinity 24 (as mg CaCO₃/L), effluent temperature 19°C, effluent pH 6 and 9, and an assumed effluent alkalinity 50 (as mg CaCO₃/L).

Under these conditions the model calculates compliance with the water quality standards for pH and temperature. The technology-based effluent limitation for pH protects the water quality criteria. Temperature does not require a limitation.

Fecal coliform bacteria. Ecology calculated the concentration of fecal coliform bacteria by mixing analysis using the technology-based limit of 400 colonies per 100 ml and a dilution factor of 145. The technology-based limit will allow compliance with the water quality standards for fecal coliform bacteria.

Reasonable Potential to Exceed Water Quality Criteria for Aquatic Life Protection. Federal regulation (40 CFR 122.44) requires NPDES permits to contain effluent limits for toxic chemicals whenever there is a reasonable potential for those chemicals to exceed the water quality criteria. This process occurs concurrently with the application of technology-based effluent limits. Discharges with technology-based effluent limits defined in regulation are not exempted from meeting the water quality standards or from having water quality-based effluent limits.

Based on monitoring by the applicant the effluent has the toxic pollutants ammonia and chlorine. Federal regulations require Ecology to determine the reasonable potential of these pollutants to cause a violation of the water quality standards.

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The determination of the potential of a chemical element or compound to violate the water quality standards partially depends upon the amount of mixing that occurs in an assigned mixing zone. For the Castle Rock WWTP, Ecology has determined that a mixing zone is required because the effluent exceeds the water quality criteria with technology-based controls.

Ecology evaluated the potential of the toxic chemicals identified in the effluent to exceed the water quality criteria for the protection of aquatic life during the receiving water's critical condition. The parameters used in the critical condition modeling are: acute dilution factor 6, chronic dilution factor 145, receiving water temperature 13.9°C, receiving water hardness of 24 (as mg CaCO₃/L), and 0.063 mg/l ammonia (as N).

Ecology evaluated the reasonable potential for exceeding water quality using the procedure in the EPA document *Technical Support Document for Water Quality-based Toxics Control* (EPA/505/2-90-001, PB91-127415, March 1991) and Ecology's *Permit Writer's Manual*. The reasonable potential evaluation identifies a requirement for a chlorine water quality-based permit limitation. Appendix C contains the spreadsheet output.

Castle Rock could not, most probably, comply with a water quality-based chlorine limitation and the technology-based fecal coliform bacteria limitation upon permit issuance. The draft permit has an interim period without chlorine limitations but Condition S1.B has a schedule of compliance for Castle Rock to comply with the limitations.

The final water quality-based effluent limitations for total chlorine residuals are:

Average monthly limit:	0.054 mg/l
Maximum daily limit:	0.114 mg/l

Reasonable Potential to Exceed Water Quality Criteria for Human Health Protection. The National Toxics Rule lists 91 numeric water quality criteria for the protection of human health. Ecology must evaluate the a discharge to determine if it has a reasonable potential to violate these criteria.

Human health-based water quality criteria incorporate several exposure and risk assumptions. These include: (1) a 70-year lifetime of daily exposures, (2) a 6.5 grams per day ingestion rate for fish or shellfish, (3) 2 liters/d ingestion rate for drinking water, and (4) a one-in-one million excess cancer risk for carcinogenic chemicals. These exposure assumptions will provide a safe level of protection for most individuals. However, the criteria do not account for additive or synergistic effects of multiple contaminants on human health, and they contain the assumption that 100 percent of exposures are from ingesting fish or waters and no exposure occurs from air, other foodstuffs, or groundwater or public drinking water supplies. The criteria address a combination of cancer and non-cancer effects. If a chemical has both cancer and non-cancer effects, the effect that results in the most stringent criteria is the criteria issued in the NTR.

The process of performing a reasonable potential determination is similar to that used for evaluating the effluent's compliance with the water quality standards. The only differences involve the model inputs for the critical flow conditions and the criterion values.

A reasonable potential determination is conducted for each chemical in the discharge that (1) has an associated human health-based criterion, and (2) has been found in the discharge during the last permit

cycle. The procedure for performing the evaluations is specified in the *Permit Writers Manual*. The discharge must comply with the human health-based criteria at the boundary of the chronic mixing zone. The *Permit Writers Manual* requires using the average design flow for the carcinogens and the dry weather design flow for the non-carcinogens. For receiving water conditions the *Permit Writers Manual* specifies using the harmonic mean for evaluating the carcinogens and the 30-day 5-year (30Q5) low flow condition for evaluating the non-carcinogens.

Castle Rock has not monitored for the chemical compounds listed in the NTR. At this time Ecology does not anticipate the effluent to contain these compounds in toxic quantities and compliance with the water quality standards for aquatic life should be protective of human health. If data becomes available that indicates differently Ecology will further evaluate the discharge for compliance with the human health criteria.

Whole Effluent Toxicity

The water quality standards require that the effluent will not cause toxic effects in the receiving waters. Many toxic pollutants cannot be detected by commonly available detection methods. However, toxicity can be measured directly by exposing living organisms to the wastewater in laboratory tests and measuring the response of the organisms. Toxicity tests measure the aggregate toxicity of the whole effluent and, therefore, this approach is called whole effluent toxicity (WET) testing. The WET testing requirement is authorized by RCW 90.48.520, 40 CFR 122.44, and WAC 173-205 and measures both acute toxicity and chronic toxicity.

Acute toxicity tests measure death as the significant response to the toxicity of the effluent. Acute toxicity tests provide an indication of the potential lethal effect of the effluent to organisms in the receiving environment. The expired permit, issued in 1980, did not require toxicity testing.

Chronic toxicity tests measure various sublethal toxic responses such as retarded growth or reduced reproduction. Chronic toxicity tests often involve either a complete life cycle test of an organism with an extremely short life cycle or a partial life cycle test on a critical stage of one of a test organism's life cycles.

The permit writer evaluated the Castle Rock WWTP and influent loadings according to WAC 173-205-040 to determine the necessity for whole effluent toxicity testing. According to the regulation's criteria, unidentified sources of toxicity are not expected to be present in the effluent from the Castle Rock WWTP. In accordance with the regulation the draft permit does not require whole effluent toxicity testing. Ecology may require toxicity testing if data indicates the effluent has unidentified toxicity.

Sediment Quality

Ecology has promulgated aquatic sediment standards, WAC 173-204, to protect aquatic biota and human health. These standards state that Ecology may require permittees to evaluate the potential for the discharge to cause a violation of applicable standards, WAC 173-204-400. Ecology has determined through a review of the effluent characteristics that this discharge has no reasonable potential to violate the sediment management standards.

Monitoring and Reporting

Effluent monitoring, recording, and reporting are required (WAC 173-220-210) to verify that the effluent complies with the permit limitations.

The monitoring and testing schedule is detailed in the permit under Condition S2. Specified monitoring frequencies take into account the quantity and variability of discharge, the treatment method, past compliance, significance of pollutants, and cost of monitoring. The required monitoring frequency is consistent with agency guidance given in the current version of the *Permit Writers Manual* for municipal wastewater treatment plants with trickling filters as the method of secondary treatment. This frequency of monitoring is considered to be the minimum frequency to document compliance.

Prevention of Wastewater Treatment Plant Overloading

Overloading of the treatment plant may result in a violation of the terms and conditions of the permit. To prevent this from occurring, Chapter 90.48.110 RCW and WAC 173-220-150 require the Permittee to take the actions detailed in permit requirement S4 to plan expansions or modifications before existing capacity is reached, and to report and correct conditions that could result in new or increased discharges of pollutants. Condition S4 restricts the influent flow and loadings to values no greater than the Ecology approved design criteria.

Operation and Maintenance

The proposed permit contains Condition S5 as authorized under RCW 90.48.110, WAC 173-220-150, WAC 173-230, and WAC 173-240-080. Ecology includes the condition to ensure proper operation and regular maintenance of equipment, and to ensure that adequate safeguards are taken so that constructed facilities are used to their optimum potential in terms of pollutant capture and treatment.

Residual Solids Handling

To prevent water quality problems occurring from the improper storage, handling, or disposal of solid wastes, the Permittee is required in permit Condition S7 to handle and dispose of all residual solids in accordance with the requirements of RCW 90.48.080 and the jurisdictional health department; Ecology-required management plan (WAC 173-240-060(3)(m)); state water quality standards; and applicable federal laws.

Biosolids Use and Disposal

Castle Rock must comply with federal, state, and local jurisdictional health department requirements for the use or disposal of sewage sludge and biosolids. The federal regulations published in 40 CFR part 503 establish technical standards for land application, surface disposal, and incineration. Final use or disposal of biosolids or sewage sludge requires a permit.

Pretreatment

To provide more direct and effective control of pollutants discharged, several municipal permittees have been delegated permitting, monitoring, and enforcement authority for industrial users that discharge to their treatment system. Ecology oversees the delegated Industrial Pretreatment Program to assure compliance with the federal pretreatment regulations (40 CFR Part 403) and categorical standards and state regulations (RCW 90.58 and WAC 173-216).

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Castle Rock does not have any known significant industrial users to required initiating a delegated pretreatment program. However, some day an industrial user survey may be required to determine the extent of compliance of all industrial users of the city's municipal wastewater collection and treatment system with federal and state pretreatment regulations.

Condition S8 of the draft permit specifies the prohibition of the discharge into the collection system of wastes with specific deleterious characteristics.

Outfall Evaluation

The permit requires Castle Rock to conduct an outfall inspection one year before permit expiration and submit a report detailing the findings of that inspection. The purpose of the inspection is to determine the condition of the discharge pipe and diffusers and to determine if sediment is accumulating in the vicinity of the outfall.

General Conditions

General Conditions are based directly on state and federal law and regulations and have been standardized for all NPDES permits issued by Ecology.

Permit Modifications

Ecology may modify this proposed permit after issuance to impose numerical limitations, if necessary to meet water quality criteria, human health criteria, or sediment quality standards based on new information obtained from sources such as inspections, effluent monitoring, and outfall inspections. Ecology may also modify this permit as a result of new or amended state or federal regulations.

APPENDIX A--DEFINITIONS

Acute Toxicity--The lethal effect of a compound on an organism that occurs in a short period of time, usually 48 to 96 hours.

Ambient Water Quality--The existing environmental condition of the water in a receiving water body.

Ammonia--Ammonia is a product of the oxidation of nitrogenous materials in wastewater. Unionized ammonia is toxic to aquatic organisms and instream organisms use dissolved oxygen to oxidized ammonia to nitrate, thereby reducing the concentration of dissolved oxygen available to other organisms such as fish. Ammonia also increases the amount of chlorine needed to disinfect wastewater.

BOD₅--Five day Biochemical Oxygen Demand is the quantity of oxygen utilized by a mixed population of microorganisms in an aerobic oxidation for 5 days at a controlled temperature of 20°C. BOD is used in modeling to measure the reduction of dissolved oxygen in a receiving water after effluent is discharged. Although BOD is not a specific compound, it is defined as a conventional pollutant under the federal Clean Water Act.

Chlorine--Chlorine is used to disinfect wastewaters of pathogens harmful to human health. It is toxic to aquatic life.

Chronic Toxicity--The effect of a compound on an organism over a relatively long time, often 1/10 of an organism's lifespan or more. Chronic toxicity can measure survival, reproduction or growth rates, or other parameters to measure the toxic effects of a compound or combination of compounds.

Class 1 Inspection--A walk-through inspection of a facility that includes a visual inspection and some examination of facility records. It may also include a review of the facility's record of environmental compliance.

Class 2 Inspection--A walk-through inspection of a facility that includes the elements of a Class 1 Inspection plus sampling and testing of wastewaters. It may also include a review of the facility's record of environmental compliance.

Critical Condition--The time during which the combination of receiving water and waste discharge conditions have the highest potential for causing toxicity in the receiving water environment. This situation usually occurs when the flow within a water body is low, thus, its ability to dilute effluent is reduced.

Fecal Coliform Bacteria--Fecal coliform bacteria are used as indicators of pathogenic bacteria in the effluent that are harmful to humans. Pathogenic bacteria in wastewater discharges are controlled by disinfecting the wastewater. The presence of high numbers of fecal coliform bacteria in a water body can indicate the recent release of untreated wastewater and/or the presence of animal feces.

Mixing Zone--A volume of receiving water that surrounds an effluent discharge within which water quality criteria may be legally exceeded. The volume of the authorized mixing zone is specified in a facility's permit and follows procedures outlined in state regulations (Chapter 173-201A WAC).

National Pollutant Discharge Elimination System (NPDES)--The NPDES (Section 402 of the Clean Water Act) is the federal wastewater permitting system for discharges to navigable waters of the United

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States. Many states, including the state of Washington, have been delegated the authority to issue these permits. NPDES permits issued by Washington state permit writers are joint NPDES/State permits issued under both state and federal laws.

pH--The pH of a liquid measures its acidity or alkalinity. A pH of 7 is defined as neutral, and large variations above or below this value are considered harmful to most aquatic life.

Technology-based Effluent Limit--A permit limit that is based on the ability of a treatment method to reduce the pollutant.

Total Suspended Solids (TSS)--Total suspended solids is the particulate material in an effluent. Large quantities of TSS discharged to a receiving water may result in solids accumulation. Apart from any toxic effects attributable to substances leached out by water, suspended solids may kill fish, shellfish, and other aquatic organisms by causing abrasive injuries and by clogging the gills and respiratory passages of various aquatic fauna. Indirectly, suspended solids can screen out light and can promote and maintain the development of noxious conditions through oxygen depletion.

Water Quality-based Effluent Limit--A limit on the concentration of an effluent parameter that is intended to prevent the concentration of that parameter from exceeding its water quality criterion after it is discharged into a receiving water.

APPENDIX B

APPENDIX C